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Presented for filing is a new original patent application of:

Applicant: JAY H. CONNELLY
Title: BROADCASTING AND PROCESSING MULTIPLE DATA FORMATS

Enclosed are the following papers, including those required to receive a filing date under 37 CFR §1.53(b):

	<u>Pages</u>
Specification	12
Claims	8
Abstract	1
Declaration	1
Drawing(s)	6

Enclosures:

- Assignment cover sheet and an assignment, 2 pages, and a separate \$40.00 fee.
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Respectfully submitted,



Scott C. Harris
Reg. No. 32,030
Enclosures

APPLICATION
FOR
UNITED STATES LETTERS PATENT

TITLE: **BROADCASTING AND PROCESSING MULTIPLE DATA FORMATS**

APPLICANT: **JAY H. CONNELLY**

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BROADCASTING AND PROCESSING MULTIPLE DATA FORMATSBackground of the Invention

5 This invention relates to broadcasting and processing data.

 Some digital televisions use a viewer application to process data from an audio or video broadcast. The viewer application decodes and presents homogeneous data from different content providers for listening or viewing.

5 Recently, several new content formats have been developed for data broadcasts. These new contents combine video data and with other content data that enables interactive viewing. New types of software viewer applications process the new content formats.

10

Summary of the Invention

 In a first aspect, the invention provides a method of broadcasting data. The method includes sending to a receiver scheduling information that includes a scheduled time and
15 broadcasting data at the scheduled time. The scheduling information identifies one or more viewer applications capable of processing the broadcast data.

 In a second aspect, the invention provides a method of processing data. The method includes receiving scheduling
20 information that provides broadcast times for data broadcasts and information to identify viewer applications to process

the data broadcasts. The method also includes receiving data from one of the broadcasts at the scheduled broadcast time and processing the received data with a viewer application responsive to the scheduling information.

5 In a third aspect, the invention provides a method of processing data. The method includes receiving scheduling information that provides broadcast times for data broadcasts and information for identifying viewer applications for processing the broadcasts. The method also includes writing
10 the scheduling information to a scheduling table having entries indexed by scheduled broadcast times and channels.

In a fourth aspect, the invention provides a method of processing data. The method includes receiving data from a broadcast at a scheduled broadcast time and selecting a
15 viewer application from a table of available viewer applications to process the data. The method also includes processing the received data with the selected viewer application.

Other features and advantages of the invention will be
20 apparent from the following description and claims.

Brief Description of the Drawings

FIG. 1 illustrates a network for broadcasting data in accordance with an embodiment of the invention;

FIG. 2 illustrates a device for viewing data broadcast on the network of FIG. 1 in accordance with an embodiment of the invention;

FIG. 3 is a flow chart illustrating a method of
5 processing broadcasted data in accordance with an embodiment of the invention;

FIG. 4 shows a portion of an exemplary scheduling table in accordance with an embodiment of the invention;

FIG. 5 shows a portion of an exemplary viewer
10 application selection table in accordance with an embodiment of the invention; and

FIG. 6 is a flow chart illustrating a method of broadcasting data in accordance with an embodiment of the invention.

Detailed Description

FIG. 1 illustrates a network 10 for broadcasting data from transmitters 11-13 to receivers 15-18. The transmitters 11-13 dynamically change the content format of the data in
20 successive broadcasts. The receivers 15-18 dynamically adjust to process the different content formats differently.

Each receiver 15-18 includes a television with a programmable processor or a personal computer for presenting the broadcasts to viewers. The receivers 15-18 are

dynamically reprogrammable to process data from different broadcasts differently.

The transmitters 11-13 broadcast the data through a transport medium 20, such as the Internet, i.e., in multicast
5 group broadcasting, a cable network, a wireless network, a satellite network, an Advanced Television Systems Committee (ATSC) network. The medium 20 has separate broadcast channels on which different transmitters 11-13 may broadcast. A viewer tunes his receiver 15-18 to one of the channels to
10 receive data from the transmitter 11-13 using that channel.

The transmitters 11-13 broadcast data in a digital coded format. The broadcast data is received and processed by the receivers 15-18. The processing includes decoding the data and presenting the decoded data for audio listening or
15 video viewing. Each receiver 15-18 can process several content formats of broadcast data.

The data of each broadcast belongs to one content format, but the broadcasts can have any format. The content formats may conform to standards and may contain additional
20 features specific to particular content providers. The standards include the MPEG-2 standard, published in ISO/IEC directives 13818-1 to 13818-3, approved Nov. 1994; the standard proposed in ATVEF comment Draft Specification version 1.1, published by the Advanced TV Enhancement Forum

in July 1998; or another standard for coding video or audio data. The features specific to particular providers are enhancements to standard formats, e.g., Disney ATVEF format. The enhancements enable individual content providers to
 5 exercise control over processing performed by the receivers
 15-18 as described below.

FIG. 2 shows the receiver 15 of FIG. 1 embodied in a personal computer 15'. The personal computer 15' has a microprocessor 21 that can use several viewer applications
 10 23-25 to process broadcast data 21 received from network interface 22. The viewer applications 23-25 are stored in a writable data storage device 26, e.g., a hard disk or random access memory (RAM). The viewer applications 23-25 enable the microprocessor 21 to decode the broadcast data received
 15 from the interface 22 and to present the decoded data on listening and visual viewing devices 29, 30.

The microprocessor 21 executes a control application 19 that selects an appropriate viewer application 23-25 to process data from each broadcast. The control application 19
 20 uses a scheduling table 31 and a viewer application selection table 32 to select one of the viewer applications 23-25 for processing data from each broadcast. The scheduling and viewer application selection tables 31, 32 are also stored in

the data storage device 26 and can be updated by the microprocessor 21.

A user can make new viewer applications 23-25 available to the microprocessor 21. To add a new viewer application 23-25, the user stores the new application 23-25 to the data storage device 26 and adds an entry for the new application 23-25 in a viewing application selection table 32. Each entry includes a number of parameters for identifying broadcast data that can be processed with the new viewer application 23-25. For example, the parameters may include a broadcast channel, content provider, and/or content format.

A content provider may make new viewer applications available to users, e.g., to support new features of content formats being produced by the provider. The new viewer applications may be distributed on magnetic or optical disks 27 in a form readable by a disk reader 28. The new viewer applications may also be distributed through an Internet site where a user can download the applications or broadcast over a satellite, ATSC, or cable network.

FIG. 3 is a flow chart for a method 40 by which a receiver, e.g., a receiver 15-18 of FIGs. 1-2, processes data broadcast by a transmitter, e.g., a transmitter 11-13. To start processing, a user tunes his or her receiver to a

channel on which a transmitter broadcasts (step 41). In response to the selection, the receiver receives data broadcast on the selected channel (step 42). In response to receiving data from the selected channel, receiver looks up
 5 schedule information with relevant characteristics for identifying the viewer application 23-25 to process the scheduled data broadcast (step 44). These characteristics may include the content provider and content format as shown in exemplary scheduling table 31. The characteristics may
 10 also include information on viewer ages, e.g., to stop children from seeing portions of some broadcasts. The look up includes comparing the actual broadcast time and channel with entries of the scheduling table 31, which are indexed by channel and time. The look up dynamically associates
 15 relevant characteristics, e.g. the individual content provider and content format, with each broadcast.

FIG. 4 shows a portion of one embodiment of the scheduling table 31 of FIG. 2. The scheduling table 31 has entries 32-35, which are indexed by broadcast time interval
 20 and channel in columns A and B, respectively. The entries 32-35 provide information for identifying one or more viewer applications 23-25 for processing a scheduled broadcast. In the exemplary table 31, the information includes an identity of a content provider and a content format in columns C and D

for each broadcast. The content provider is the entity that created the broadcast data. Content providers include organizations, such as ABC, NBC, CBS, and Disney that produce products for broadcast by different transmitters. Content
5 providers may also include single transmitters, e.g., one of the transmitters 11-13, which broadcast data in special local formats.

Referring again to FIG. 3, information from the scheduling table 31 enables selections of viewer applications
10 23-25 adapted to processing the scheduled broadcast data. The receiver selects a viewer application 23-25 by using the information looked up in the scheduling table 31 as an index for finding entries 51-55 in the viewer application selection table 32 (step 46). The entries 51-55 list the viewer
15 applications 23-25 that are presently available to the receiver.

Each entry of the scheduling table 31 identifies one or more entries for viewer applications 23-25 in the viewer application selection table 32. Each identified viewer
20 application 23-25 can process the broadcast data associated with the entry in the scheduling table 31. The receiver 15' selects a best entry from among the identified entries as described below. The receiver 15' decodes and displays the

data using the viewer application 23-25 associated with the best entry (step 48).

FIG. 5 shows a portion of one embodiment of the viewer application selection table 32 of FIG. 2. The viewer application selection table 32 has entries 51-55, which are indexed by information relevant to identifying a viewer application 23-25. Here, the data includes a broadcast channel, a content provider, and a content format in columns E, F, and G, respectively. Each entry 51-55 assigns one viewer application 23-25, in column H, to use to process broadcast data described by the information in columns E, F, and G, i.e., scheduling information.

The viewer application selection table 32 of FIG. 5 is an example of one such table. Other embodiments may employ viewer application selection tables 32 having other types of attribute value pairs in columns E, F, G, H.

Several entries 51-55 of the viewer application selection table may match information from one entry 32-35 of the scheduling table 31. For example, the entry 33 of the scheduling table 31 has broadcast channel 2, provider ABC, and format ATVEF. These broadcast parameters match index fields of columns E, F, and G, for the entries 52-54 of the viewer application selection table 32. If multiple matches occur, the receiver 15' selects the entry that best matches

the scheduling information and uses the viewer application 23-25 associated with that entry to process the broadcast data.

In one embodiment, the best matching entry has more
 5 non-blank index columns than other matching entries of the viewer application selection table 32. If no matches occur with all non-blank entries, the receiver 15' looks for a match with entries having one blank field. The search continues to less specific entries if matches are still not
 10 found, i.e., two blank fields, etc. In the above example, the entry 54 is the best match, because this entry 54 has two non-blank index columns F, G whereas the entries 52-53 only have one non-blank column each, i.e., columns F or G.

Some receivers assign weights to the columns E-G for
 15 use in determining which entry 51-55 is the best match. For example, the weights may be 1, 2, and 3 for columns E, F, and G, respectively. Then, an NBC broadcast of ATVEF data on channel 8 matches both entries 52 and 55 in the viewer application selection table 32 shown in FIG. 5. But, the
 20 receiver selects the Intel ATVEF viewer application, because the weight of the column G is higher than that of column E, i.e., the entry 52 is the best match.

The viewer application selection table 32 provides multiple matches, because the receivers 15-18 of FIG. 1 have

default applications among the viewer applications 23-25.

The default applications can process many content formats.

More specific matches provide viewer applications 23-25 that support additional features in broadcast data. For example,

5 content provider ABC may incorporate special interactive features into its ATVEF content. Those features are presented to viewer if the receiver 15' processes the ABC broadcast data with a Disney General Viewer of entry 54, i.e., a specific match. If the receiver 15' does not have
10 the Disney general viewer, the receiver 15' processes ABC ATVEF broadcasts with the default Intel ATVEF viewer, i.e., associated with entry 52. The default viewer may not support the special interactive features incorporated by ABC.

FIG. 6 is a flow chart illustrating a method 60 used
15 by a transmitter, e.g., a transmitter 11-13 of FIG. 1, to broadcast data. The transmitter sends a scheduling message to the receivers, e.g., the receivers 15-18 of FIG. 1 (step 62). The scheduling message provides scheduling information for one or more broadcasts, i.e., one or more entries 33-35
20 in the scheduling table 31 shown in FIG. 4. The scheduling information may include time interval, channel, content provider, and/or content format.

In response to receiving a scheduling message, a receiver updates its scheduling table, e.g., the table 31 of

FIG. 2 for the receiver 15. The receiver writes a new entry to its scheduling table for each new data broadcast announced by a received scheduling message.

In the network 10, the scheduling messages may also
5 be sent over the same medium 20 of FIG. 1 that transports data for viewing or over a separate network. The separate network may be the Internet or a service information channel reserved for sending scheduling messages from the transmitters 11-13 to the receivers 15-18.

10 The transmitter broadcasts the scheduled data over the channel at the time period announced in the previous scheduling message (step 64). The scheduling messages are sent sufficiently ahead of data broadcasts to ensure that receivers can update their scheduling tables 31 prior to the
15 broadcasts.

Other embodiments are within the scope of the following claims.

What is claimed is:

1. A method of broadcasting data, comprising:
sending to a receiver scheduling information that
includes a scheduled time and identifies one or more viewer
applications capable of processing a broadcast of data at the
5 scheduled time; and
broadcasting the data at the scheduled time.

2. The method of claim 1, wherein the information
includes a content format of the broadcast of data.

10 3. The method of claim 1, wherein the sent
information identifies one of a viewer age and a content
provider for the data.

15 4. The method of claim 3, wherein the sent
information identifies a channel for broadcasting the data;
and
the broadcast transmits the data in the identified
channel.

20 5. The method of claim 4, wherein the identified
channel comprises one of a cable channel, a wireless channel,
and a multicast group address.

6. The method of claim 2, wherein the viewer applications decode broadcasted data.

7. The method of claim 1, wherein the broadcasting
5 starts at a predetermined time after the sending of the information.

8. The method of claim 2, wherein the content format is an ATVEF format.

10

9. The method of claim 1, further comprising:
sending second information about a second scheduled
time and content format for a broadcast of new data, the
second content format being indicative of a new viewer
15 application for processing the new data; and

then, broadcasting the new data during the second
scheduled time.

10. A method of processing data, comprising:
20 receiving scheduling information providing broadcast
times for data broadcasts and information to identify one or
more viewer applications to process the data broadcasts;
receiving data from one of the broadcasts at the
scheduled broadcast time; and

processing the received data with a viewer
application responsive to the scheduling information.

11. The method of claim 10, wherein the scheduling
5 information identifies channels scheduled to broadcast the
data.

12. The method of claim 10, wherein the scheduling
information associated with a portion of the broadcasts
10 identifies one of content formats, viewer ages, and content
providers of the associated data.

13. The method of claim 10, wherein the processing
comprises:
15 decoding the received data.

14. A method of processing data, comprising:
receiving scheduling information that provides
broadcast times for data broadcasts and information for
20 identifying viewer applications for processing the
broadcasts; and

writing the scheduling information to a scheduling
table having entries indexed by scheduled broadcast times and
channels.

15. The method of claim 14, further comprising:

selecting a viewer application to process received data based on information in the scheduling table.

5 16. A method of processing data, comprising:

receiving data from a broadcast at a scheduled broadcast time; and

selecting a viewer application from a table of available viewer applications to process the data; and

10 processing the received data with the selected viewer application.

17. The method of claim 16, further comprising:

15 looking up format information on the received data in a scheduling table; and

wherein the selecting uses the looked up information to select a viewer application.

18. A system for receiving data broadcasts,
20 comprising:

an interface to receive broadcasts of data;

a data storage device storing viewer applications to decode the received data; and

a processor coupled to the data storage device, the processor to select and execute ones of the viewer applications based on scheduling information for the broadcasts.

5

19. The system of claim 18, wherein the data storage device further stores an executable control application for updating a scheduling table in response to receiving new scheduling information for a broadcast of data.

10

20. The system of claim 19, wherein the control application selects the ones of the viewer applications to decode data based on information from the scheduling table.

15

21. The system of claim 19, wherein the control application selects the ones of the viewer applications based on availability data for the viewer applications stored in a viewer application selection table.

20

22. A data storage device encoding computer executable instructions for a method of broadcasting data, the instructions to cause the computer to:

send information to a receiver about a scheduled time and content format for a broadcast of data, the content

format being indicative of one or more viewer applications
for processing the data; and

broadcast the data at the scheduled time.

5 23. The device of claim 22, wherein the information
identifies one of a content provider, a viewer age, and a
scheduled broadcast channel for the data.

10 24. The device of claim 22, wherein the instructions
cause the computer to broadcast the data at a predetermined
time after the sending of the information.

 25. The device of claim 22, the instructions further
causing the computer to:

15 broadcast second information about a second scheduled
time and content format for a new broadcast of new data, the
second content format being indicative of another viewer
application to process the new data; and

 then, broadcast the new data at the second scheduled
20 time.

 26. A data storage device storing executable
instructions, the instructions to cause a computer to:

receive scheduling information for content formats
and broadcast times of broadcasts of data;

receive data from one of the broadcasts at the
scheduled broadcast time; and

5 process the received data with a viewer application
for processing a data format, the viewer application being
responsive to the scheduling information for the one of the
broadcasts.

10 27. The device of claim 26, wherein the scheduling
information identifies channels scheduled to broadcast the
data.

15 28. The device of claim 26, wherein the instructions
to process further causes the computer to:
decode the received data.

20 29. The device of claim 26, the instructions further
causing the computer to:
write the scheduling information to a scheduling
table having entries indexed by scheduled broadcast times;
and

wherein the instruction causing the computer to process causes the computer to select the viewer application based on data from the scheduling table.

5 30. The device of claim 26, wherein the instruction causing the computer to process causes the computer to:

select the viewer application from a viewer application selection table listing available viewer applications.

BROADCASTING AND PROCESSING MULTIPLE DATA FORMATS

Abstract of the Disclosure

A method broadcasts data. The method includes sending to a receiver scheduling information that includes a 5 scheduled time and broadcasting data at the scheduled time. The scheduling information identifies one or more viewer applications capable of processing the broadcast data.

392319.B11

392319.B11

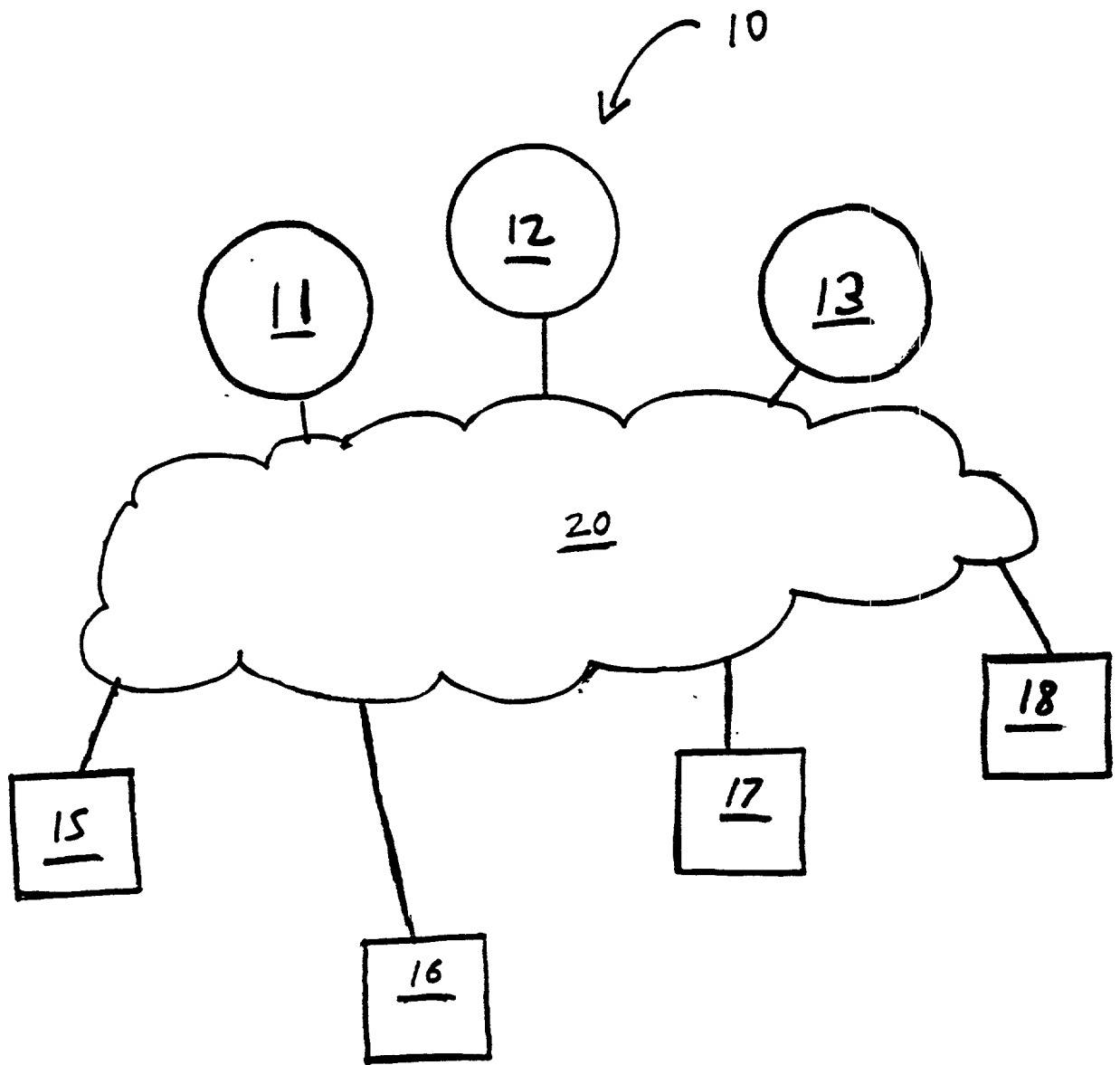
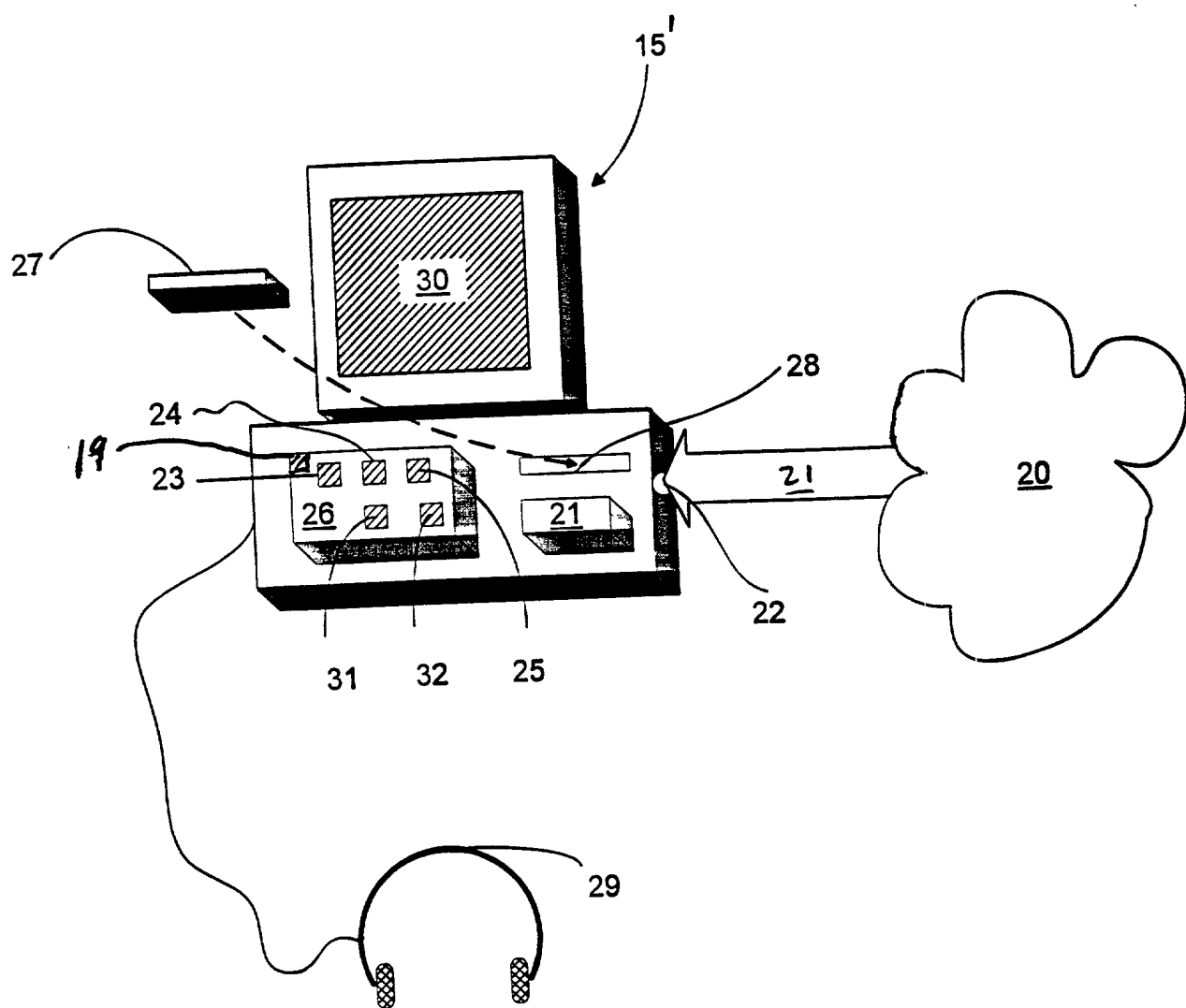


FIG. 1

FIG. 2



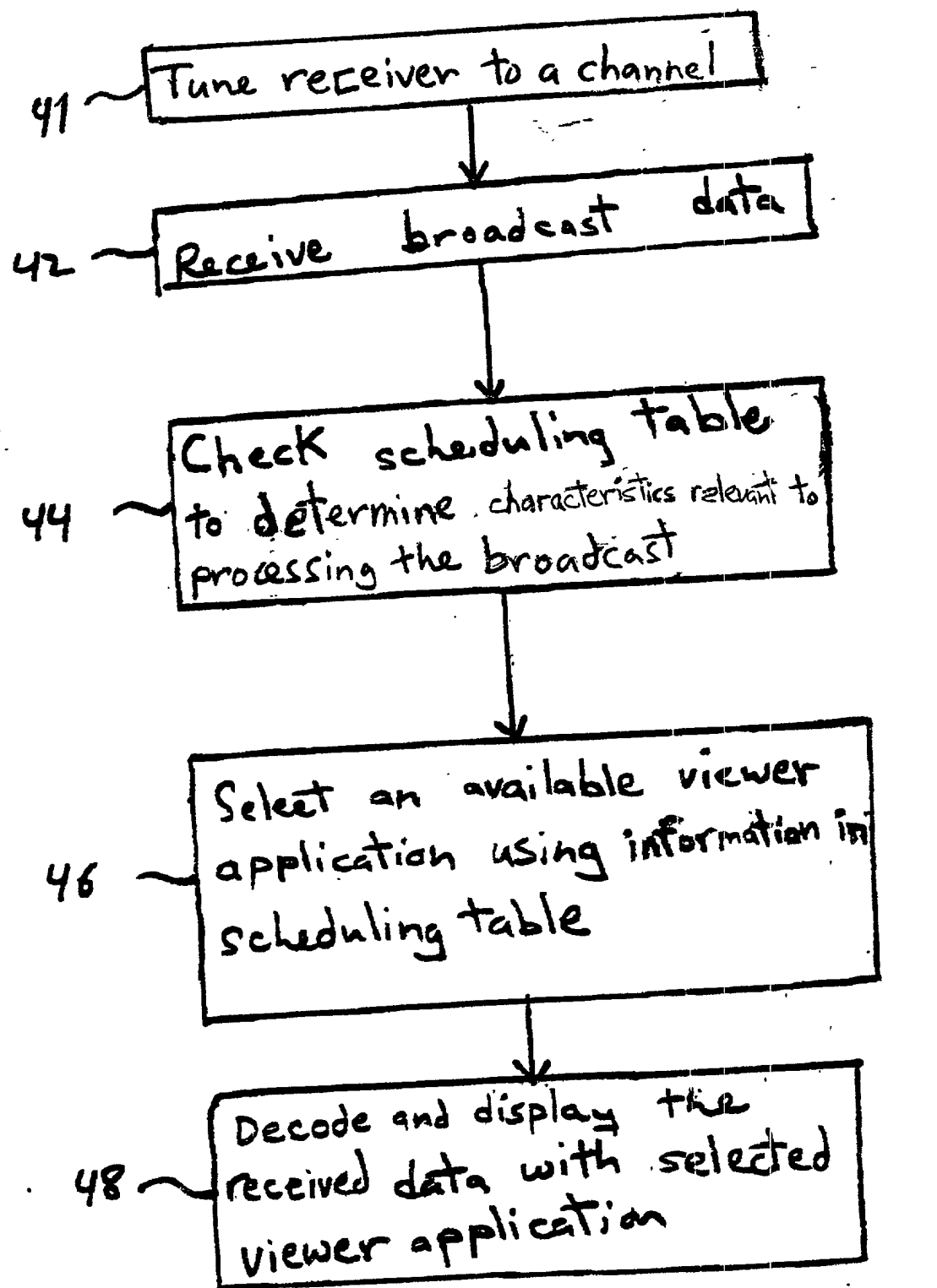


FIG. 3

FIG. 4

31

Start time	Stop time	Channel	Provider	Format
8:00	8:30	1	ABC	MPEG2 ³²
8:00	8:30	2	ABC	ATVP ³³
8:00	9:00	3	ContentCo	ContCo ³⁴
8:00	9:00	4	NBC	ATVP ³⁵

A

B C D

FIG. 5

32

Channel	Content Provider	Content Format	Viewer Application
		MPEG-2	Generic MPEG2 Viewer
		ATVEF	Intel ATVEF Viewer
	ABC		Disney General Viewer
	ABC	ATVEF	Disney General Viewer
8			NBC Viewer

↑ E

↑ F

↑ G

↑ H

51

52

53

54

55

Broadcast scheduling
message to receivers 62



Broadcast the sched-
uled data at the
scheduled time and on
the scheduled channel 64

60 ↗

FIG. 6

PATENT

ATTORNEY DOCKET NO: 10559/055001/P7404

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled BROADCASTING AND PROCESSING MULTIPLE DATA FORMATS, the specification of which

☒ is attached hereto.

☐ was filed on _____ as Application Serial No. _____ and was amended on _____.

☐ was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on _____.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information I know to be material to patentability in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim the benefit under Title 35, United States Code, §119(e)(1) of any United States provisional application (s) listed below:

U.S. SERIAL NO.	FILING DATE	STATUS
		<input type="checkbox"/> Pending <input type="checkbox"/> Issued <input type="checkbox"/> Abandoned

I hereby appoint the following attorneys and/or agents to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: Scott C. Harris, Reg. No. 32,030; William J. Egan, III, Reg. No. 28,411; David L. Feigenbaum, Reg. No. 30,378; John F. Land Reg. No. 29,554; Ralph A. Mittelberger, Reg. No. 33,195; Hans R. Troesch, Reg. No. 36,950; John R. Wetherell, Jr., Reg. No. 31,678; and Bing Ai, Reg. No. 43,312 of Fish & Richardson, P.C.

Address all telephone calls to Scott C. Harris at telephone number 617/542-5070.

Address all correspondence to Scott C. Harris, Fish & Richardson P.C., 225 Franklin Street, Boston, MA 02110-2804.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

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